Design a PID controller for a constant speed of combustion engine

ABSTRACT

The engine speed can be controlled by controlling the air-fuel intake available for combustion in the cylinder. The air-fuel intake is determined by the throttle opening. This paper presents the design of a PID controller for a constant speed engine. The PID controller regulates engine speed by manipulating the throttle opening and thus determining the air-fuel intake for combustion. It comprises of a proportional (P), integral (I) and derivative (D) controller. The Ziegler Nichols method was used to determine and tune the PID controller parameters. This method consists of two methods, of which the ultimate cycle method was used. Simulation was done on the engine timing model with closed loop available in Simulink-MATLAB software. This study was carried out using two different methods, namely the heuristic method and the linearization method. The systemôs output response was analyzed based on rise time, settling time, percentage overshoot and offset.

Keyword: Engine speed; PID controller; Ziegler Nichols; Ultimate cycle; Heuristic method; Linearization method